VDOE Science Update
September 7, 2016

Good Morning!

Students are back in school across the state (some a little earlier than others) and you all are inundated with IEPs, 504s, lesson plans, forming goals for the year, and just getting back into the swing of things. With personal and professional goal writing in the near future, it is time to reflect on our teaching strategies. All types of instruction and strategies are needed in the science classroom; however, it may be time to shift your focus of instruction in order to increase student engagement. Try increasing student engagement through implementing one or two higher level inquiry labs a quarter. Or maybe focus on the development of science process skills (the development of science skills and processes is critical to building a strong science foundation, particularly at the early elementary level).

Reflecting on your own teaching and determining how you spend your time in the classroom is a start to the goal making process. How much time is spent on teacher directed instruction (lecture, silent reading, completion of worksheets, long videos) vs student directed instruction (class discussions, cooperative learning, development of science skills, guided and structured inquiry labs). Teacher directed instruction is needed at times to develop concepts; however, to embed these concepts a higher level of student engagement is ideal. Need ideas for increasing student engagement? See the section of the science update dedicated to inquiry learning. Professional development opportunities are also a way to gain insight on increasing student engagement. The VAST (Virginia Association of Science Teachers) Professional Development Institute is around the corner and other PD opportunities are available throughout the state. You can always contact us at VDOE as well if you need ideas or support.

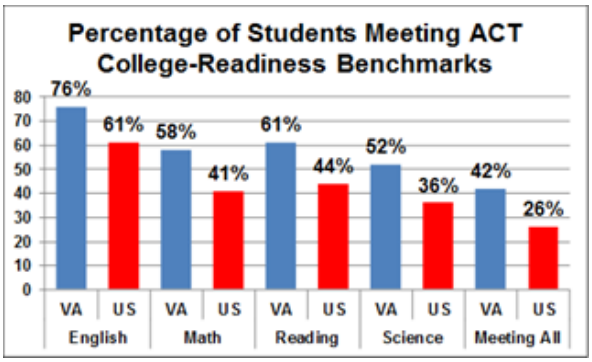
Have a wonderful week!
VDOE Science Instruction Team

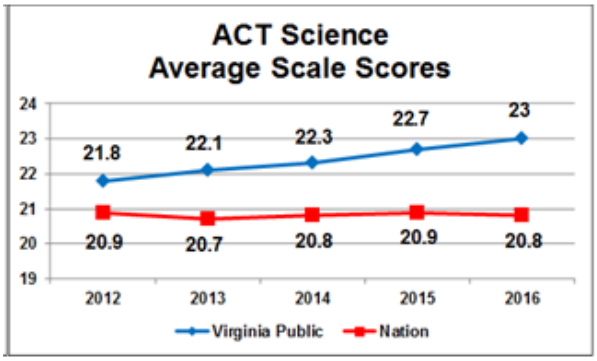
News

Virginia Students Again Outscore Nation on the ACT

Virginia students again outperformed their peers nationwide by significant margins on the ACT this year as the number of the commonwealth's high school senior taking the college-readiness examination continued to grow. The percentage of Virginia public school students meeting the ACT's college readiness benchmark in each assessed content area in 2016 was 15 or more points higher than the percentages nationwide.

"Thanks to effective teachers focused on high state standards and supported by strong division leadership, Virginia graduates continue to surpass national college-readiness benchmarks," said Superintendent of Public Instruction Steven R. Staples. "With increasing ACT participation among Virginia graduates, we are better able to use these measurements to predict how successful our young people will be for their first year of college."





Science Practice Items Now Available in TestNav™ 8

As indicated in Superintendent's Memo #294-15, Standards of Learning (SOL) practice item sets for Earth Science, Biology, and Chemistry are available in the new TestNav™ 8 delivery software . *Introduction to TestNav 8: Multiple Choice/Technology-Enhanced Item Tests*, and a newly posted document, *Introduction to TestNav 8: Writing Tool*, are also available on the VDOE Web site. If you have any questions, please contact the student assessment staff by e-mail at Student_Assessment@doe.virginia.gov or by phone at (804) 225-2102.

Grants and Awards

Chesapeake Bay Restoration Fund Advisory Committee – Restoration and Education Grants Applications due October 1, 2016

Applications will be accepted from private not-for-profit conservation organizations, schools and universities, and governmental agencies whose projects will affect water bodies that are located within the Chesapeake Bay watershed. There is no limit on the amount that an applicant may request. More information on the Chesapeake Bay Restoration Fund, including the application, W-9 and EDI forms (both new), grant guidelines, and a catalogue of past projects can be found at http://dls.virginia.gov/commissions/cbr/files/PR2017.pdf.

Technology in the Classroom

PyMOL

Educational-use-only PyMOL is a free on-line site designed to allow students or teachers manipulate high quality 3-D molecular structures and to animate molecules dynamically. The resource can be used on the computer or on an I-Pad and be a great visual asset for classroom instruction. Download protein sequences from the RCSB PDB (Protein Data Bank) and allow students to view the complex molecules that proteins can form.

BioInteractive WildCam Lab

The WildCam Lab is a part of WildCam Gorongosa, an online citizen science platform where users identify animals in trail camera photos from Gorongosa National Park, Mozambique. Using the WildCam Lab, students can investigate ecological questions by exploring trail camera data using an interactive map. They can filter and download data to perform analyses and test hypotheses. Guided activities and supporting educational resources are available on the "resources" tab of the WildCam Lab.

Teacher Opportunities

Science and the Politics of GMO

Cornell University is hosting a new edX Massive Open Online Course, "**Science and Politics of the GMO**." The course is **free** to anyone with an internet connection. Enrollment for the course is now open, and instruction begins **Sept. 13**. In this 5-week introductory course, students will learn the basics of genetic engineering, explore the political debate around the GMO, and review the arguments for and against the technology's use. The course will study the politics surrounding the GMO and its impact at both an individual level and on society as a whole, including problems, perceptions, benefits, and risks associated with GMOs. To learn more about the course, the instructors, and to enroll, visit: http://bit.ly/1XZRHSY.

NASA Goes to the Races

NASA Langley's Office of Education is hosting a professional development event at the Richmond International Raceway that will allow teachers to practice NASA inspired activities alongside NASA educational specialists. Teachers will lead three different pre-selected NASA activities with visitors related to Bernoulli's principle, differences between revolution and rotation, and Drag Race to Mars Engineering Design Challenge. All volunteers will receive an hour of professional development for every hour they are leading the activities at the event. For more information contact Colón Robles, Marilé at 757-864-8672 or at marile.colonrobles@nasa.gov.

ITTIP 9th Annual STEM Learning Summit

The Institute for Teaching through Technology and Innovative Practices at Longwood University is hosting the summit with the theme of Creating Global Learning Environments. Speakers will share strategies for teachers and administrators on how to move beyond the classroom walls and connect with students across the division, the state, and even the world. The summit will occur from 9:00AM-3:30PM on Tuesday, September 20th. The cost is $25 per person which includes lunch and parking. To register, please go to https://www.surveymonkey.com/r/STEMLearningSummit2016.

Scientists into Classrooms

The National Center for Science Education's teacher network is launching an exciting new program to get scientists into classrooms across the country. Scientists in the Classroom is a great opportunity to connect students with real-life early career scientists, as well as for teachers to have an expert on board when teaching evolution and climate change! With this program, teachers and scientists collaborate as colleagues, peers, and partners in the scientific enterprise to further science education. For more information on Scientists in the Classroom visit NCSE's website or email Minda Barbeco at Berbeco@ncse.com.

2016 Virginia Association of Science Teachers (VAST) Professional Development Institute (PDI)

The VAST PDI theme is The Faces of Science in Virginia. It builds upon last year's PDI theme Designing Inquiring Minds. The Faces of Science showcases the rich Virginia science resources that are available to you through the many science organizations and companies in Virginia. For a full description of the theme and strands, visit http://www.vast.org/presenters.html. The VAST Professional Development Institute will be held from **November 17-19** in Williamsburg, VA.

Governor Terry McAuliffe Announce Publication of The Geology of Virginia

Governor Terry McAuliffe announced the release of *The Geology of Virginia*, the first comprehensive review of Virginia geology in more than a century. The book, published by the Virginia Museum of Natural History, examines the geological history and features of the Commonwealth and offers detailed, regionally specific information. *The Geology of Virginia* is now available for purchase exclusively through the museum's website at www.vmnh.net and the Museum Store, located in Martinsville. Please visit the museum's website to learn more about the museum's publications, exhibits and programming.

National Park Service Teacher Workshop

Shenandoah National Park will present the 2nd-6th grade Teacher Workshop on Friday, September 30, 2016, from 9am-3pm. At this free workshop, teachers will learn how to incorporate the park's 2nd – 6th grade programs into their classroom lesson plans. Park rangers will familiarize teachers with Shenandoah National Park and the program materials, introduce classroom pre-visit and post-visit activities, demonstrate ranger-led activities planned for the students, and define the responsibilities of teachers, rangers, students, and chaperones on field trips. Workshop attendance is required before bringing students on a park program. To register, or for more information, call the Shenandoah National Park Education Office at 540-999-3500, ext. 3489, or email **shen_education@nps.gov.**

Virginia Tech Week of Science!

Please join Virginia Tech for a week of exciting STEM exhibits, presentations, and hands-on activities! The Week of Science starts on Friday, September 30 with a school preview day at the Science Museum of Western Virginia in Roanoke. Saturday, October 1 will be a maker event at the National Capital Region. Sunday, October 2 and Monday, October 3 will be the Southwest Virginia STEM Summit, a teacher professional development and regional economic development event. The Virginia Tech Science Festival will be held in Blacksburg on Saturday, October 8. Program and registration for the STEM Summit: http://www.cpe.vt.edu/swvstem/

Save the date: Natural Connections: Interdisciplinary Strategies for Teaching and Learning

Save the dates for this three-day collaborative conference that provides valuable professional development opportunities to make natural connections in the classroom using interdisciplinary approaches. The workshop, to be held March 15-17, 2017, costs $40 per day and is geared towards preK-6th grade educators, administrators, and pre-service teachers. Registration is scheduled to begin mid-January, 2017.

Student Opportunities

Apply for a GreenWorks! Environmental Education Grant by Sept. 30

Project Learning Tree offers grants up to $1,000 to schools and youth organizations for environmental service-learning projects that link classroom learning to the real world. Students implement an action project they help design to green their school or to improve an aspect of their neighborhood's environment. The projects partner students with their whole school, local businesses and/or community organizations, and provide opportunities for student leadership. For more info, please go to Project Learning Tree.

20th Annual Virginia Regional Competition of the National Ocean Sciences Bowl - Preregister a team by November 1!

Teachers are encouraged to pre-register a team for the 2017 Blue Crab Bowl, slated for February 17 & 18, 2017, at the Virginia Institute of Marine Science in Gloucester Point, VA. This academic competition aims to stimulate student interest in the marine sciences. And, it can help educators use the oceans as an interdisciplinary vehicle for teaching STEM subjects. Science faculty, graduate students and staff from the Virginia Institute of Marine Science and Old Dominion University coordinate and officiate the event. Find more information and an on-line pre-registration form at www.vims.edu/bcb. Or Contact Regional Coordinator, Dr. Carol Hopper Brill at chopper@vims.edu.

Inquiry Corner

Inquiry learning allows students to be active participants in their learning. Whether analyzing a discrepant event, designing and conducting a lab, or using digital resources to research a problem, inquiry learning allows learners to have ownership of their learning. There are four different levels of inquiry and each of these allow for the development of skills and are appropriate at different times in the classroom.

Inquiry looks different with different age groups as students develop scientific skills and processes and become more immersed in scientific reasoning. A teacher of a second grade classroom may have to facilitate discussion as to feasible procedures when in circle time, while a secondary teacher may allow teams to develop their own procedures to answer a given problem. As a facilitator in the learning process, the teacher ensures a safe environment that allows students to take control of their own learning.

Physical Science/Earth Science

Conditions: Given a digital scale, graduated cylinder, ruler, water, and one or more objects or liquids, (may add more items such as a watch glass, a scoopula, wire gauze etc.)**

Behavior: the students will design and conduct an experiment to determine the density of the object/liquid.

Criteria:
Prior to experimentation the teachers will synthesize an experiment to include:

- a detailed procedure that includes specific equipment needed in the experiment.

Upon completion of the experiment, the teachers will analyze the experiment to include:

- a table that includes data collected in the experiment and a graph of the data (if appropriate);
- an explanation of the data observed;
- an appropriate conclusion based on the data collected;
- an explanation of density
- any sources of error that may have been encountered in the experiment and how those errors may impact the experimental results.

Chemistry extension- Have the students identify the type of metal through comparing its density to a chart of known metal densities. Use this information to determine the percent error of their experimental calculation.

**To make things more interesting, I would give students many more choices in equipment to choose from. This would allow them the time to observe different science equipment and determine some possible roles for the equipment in the laboratory environment.

Highlighted Superintendent's Memos

- MEMO 197-16
  Announcing the 2017 Children's Engineering Convention
- MEMO 189-16
  Textbook and Instructional Materials Adoption Schedule for History and Social Science, Mathematics, English, and Science
- MEMO 185-16
  Announcement of Conference: Assessing for Deeper Learning: *A Transformative Pathway to Prepare Virginia Students for the Future* (September 26, 2016)

Contact Us

As always, please contact one of VDOE Science Team if you have questions.
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